

*AS*

**Notice of Allowability**

Application No.

10/765,911

Examiner

Thinh T. Nguyen

Applicant(s)

CAMPBELL ET AL.

Art Unit

2818

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/15/2005.
2. ☒ The allowed claim(s) is/are 1-77.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).


\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800

## **DETAILED ACTION**

### **Reason for allowance**

1. Claims 1-77 are allowed. The following is an examiner's statement of reason for allowance:

#### **I/ Group I: Claims 1-18:**

None of the references of record teaches or suggests the claimed **NON-VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- "a host material layer, said host material layer exhibiting zero field splitting and being configured to store data as an energy-absorbing state and a lesser-energy-absorbing state; and a first electrode and a second electrode, each being electrically coupled to said host material layer "--  
and all other limitations as recited in claim 1.

#### **II/ Group II: Claims 19-26:**

None of the references of record teaches or suggests the claimed **NON-VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- "A zero-field splitting memory device, comprising:  
a first electrode; a germanium selenide layer in contact with said first electrode,

said germanium selenide layer having a stoichiometry of  $\text{Ge}_x\text{Se}_{100-x}$ ;  
metal ions incorporated into said germanium selenide layer, wherein said  
germanium selenide and said metal ions are configured to absorb a detectable  
amount of energy when said memory device is programmed to an energy-  
absorbing state “—

and all other limitations as recited in claim 19.

**III/ Group III: Claims 27-41:**

None of the references of record teaches or suggests the claimed **NON-  
VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- “a host material incorporating a plurality of different metal ion types, said  
each of said different metal ion types exhibiting zero field splitting, said host  
material and said different metal ion types being configured to store data as a  
plurality of energy-absorbing states and a non-energy-absorbing state; and  
a first electrode and a second electrode, each being electrically coupled to  
said host material. “—

and all other limitations as recited in claim 27.

**IV/ Group IV: Claims 42-46:**

None of the references of record teaches or suggests the claimed **NON-  
VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- “a memory cell, comprising:  
a host material incorporating metal ions, said metal ions exhibiting zero field

splitting and said host material being configured to store data as an energy-absorbing state and a non-energy-absorbing state; and  
a first electrode and a second electrode, each being electrically coupled to said host material. “—

and all other limitations as recited in claim 42.

**V/ Group V: Claims 47-61:**

None of the references of record teaches or suggests the claimed **NON-VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- “providing a memory device comprising a host material which incorporates metal ions exhibiting zero field splitting;  
programming said memory device to an energy-absorbing state corresponding to a separation of spin states of said metal ions at zero magnetic field; and reading said memory device by sensing the absorption or transmission of a read energy pulse through said host material “—  
and all other limitations as recited in claim 47.

**VI/ Group VI: Claims 62-77:**

None of the references of record teaches or suggests the claimed **NON-VOLATILE ZERO FIELD SPLITTING RESONANCE MEMORY** having the limitations:

-- “providing a memory cell comprising a host material which incorporates a plurality of metal ion species, each said species exhibiting zero field splitting;  
programming said memory cell to at least one of a plurality of energy-

absorbing states, each said energy-absorbing state corresponding to a separation of spin states of a respective one of said plurality of metal ion species at zero magnetic field; and  
reading said memory device by sensing the absorption or transmission of one of a plurality of read energy pulses through said host material, said one read energy pulse corresponding to said respective one metal ion species “—  
and all other limitations as recited in claim 62.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance”.

### Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 571-272-1790. The examiner can normally be reached on Monday-Friday 9:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached at 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval [ PAIR ] system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thinh T Nguyen



Art unit 2818



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